

3.1.1.3 Communication System Digital information is transferred to and from Capsules in Hyperloop by short range, full duplex optical links. Optical Transceiver Units (OTU) are located at regular intervals along the inside of Tubes and elsewhere such that every Capsule can maintain constant communication. Three communication channels are designated Channel A, Channel B and Channel C and for each Channel an independent set of OTUs are connected via a redundant, counter-rotating ring topology data transport system using copper interconnect (due to the relatively close spacing of OTUs). Arrangement of communication system elements is shown in Figure 3.1.1.3-1. Individual OTUs function as Add Drop Multiplexors (ADMs) on their respective channel.

Communications are packet based, Internet Protocol on all channels. Each OTU maintains an “ephemeris” for each Capsule based on Capsule location, speed and direction information “published” on each Channel at regular intervals by the Hyperloop Control System. Based on the “ephemeris”, exactly one OTU will handle each data packet sent to or from a Capsule.

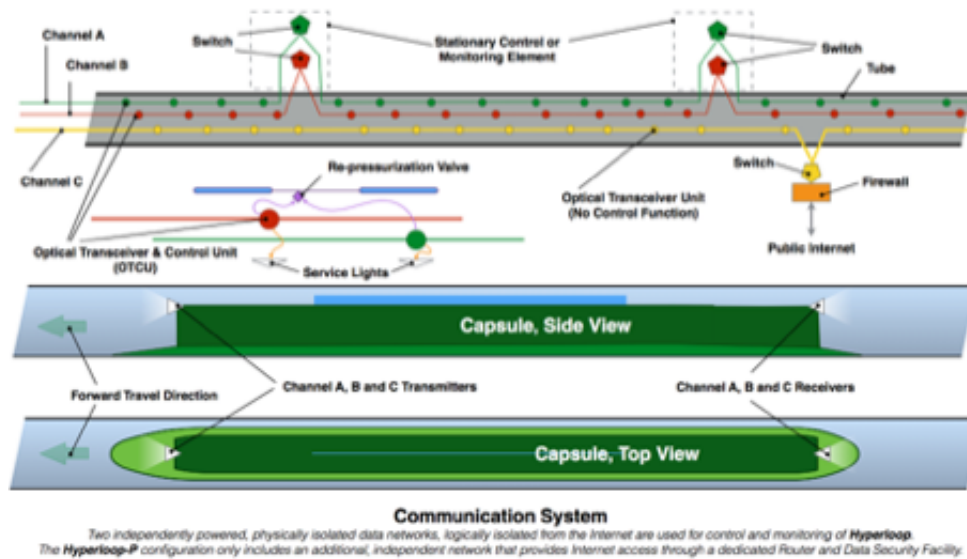


figure 3.1.1.3-1

3.1.1.3.1 Channel Separation Separate A, B and C Channels are implemented for each Hyperloop Tube. Channels A, B, C use separate wavelength pairs for communication with Capsules. These wavelengths are listed in Table 3.1.1.3-2. Channels A and B are dedicated to Hyperloop control and monitoring functions, are connected to various Hyperloop control elements, and these Channels and all equipment connected to these Channels is strictly isolated from the public Internet.

Channel C functions to distribute Public Internet service to passengers traveling in the Capsules and is present only in the Hyperloop-P configuration.

Channel	Transmission to Capsule	Transmission from Capsule
A	780 nm	904 nm
B	808 nm	980 nm
C	840 nm	1310 nm

table 3.1.1.3-2

3.1.1.3.2 Channel Bandwidth TBD

3.1.1.3.3 Auxiliary OTU Functions Channel A and B OTUs, in addition to functioning as part of the respective optical communication channel, perform the following auxiliary functions.

- 3.1.1.3.3.1 **Service Lighting** OTUs on Channels A and B, and located within the Tube function to power co-located service lighting fixtures.
- 3.1.1.3.3.2 **Re-pressurization Functions** OTUs on Channels A and B, and located within the Tube function to control and monitor elements of the Re-pressurization System described in Section 3.1.1.2.
- 3.1.1.3.3.3 **Other Auxiliary Functions** TBD (Surveillance Cameras, Speaker-Phone, Thermal/Acoustic/Electromagnetic monitoring of passing Capsule signatures - for maintenance...??)